

IN THE CLAIMS:

Claim 1 (Currently amended): An apparatus for measuring displacement, the apparatus comprising:

a machine element having a body defining an interior wherein the body has an interior surface and a length defined between a first end and a second end wherein the interior surface has a light-absorbing coating;

a first wall at the first end wherein the first wall is planar and further wherein the first wall abuts the body of the machine element;

a second wall at the second end substantially enclosing the interior;

a shaft element movable within the machine element;

a head element attached to the shaft element adjacent to the interior surface of the machine element;

a light source on the first wall of the machine element wherein the light source extends inward with respect to the interior of the machine element wherein the light source emits a light into the interior of the machine element; and

a sensor positioned on the first wall of the machine element wherein the sensor detects to detect intensity of emitted light within the interior of the machine element which is not absorbed by the coating on the interior surface of the machine element

wherein the intensity of light corresponds to a position of the head element within the machine element at ~~any~~ a point between the first end and the second end.

Claim 2 (Original): The apparatus of Claim 1 further comprising:
a coating on the shaft element.

Claim 3 (Previously amended): The apparatus of Claim 1 wherein the light-absorbing coating is an anodizing compound.

Claim 4 (Original): The apparatus of Claim 1 further comprising:
a seal disposed around the shaft element.

Claim 5 (Currently amended): The apparatus of Claim 1 further comprising:

a second sensor attached to the ~~first~~ second wall.

Claim 6 (Currently amended): The apparatus of Claim 1 further comprising:

a first brush positioned at the first wall or the second wall of the machine element.

Claim 7 (Original): The apparatus of Claim 6 wherein the first brush is constructed from wire.

Claim 8 (Currently amended): The apparatus of Claim 1 further comprising:

a second light source attached to the machine element at the ~~first~~ second wall of the machine element.

Claim 9 (Previously amended): The apparatus of Claim 1 wherein the first wall is parallel to the second wall.

Claim 10 (Previously amended): The apparatus of Claim 1 further comprising:

a coating on the head element.

Claim 11 (Previously amended): An apparatus for cleaning a machine component, the apparatus comprising:

a machine element having a body defining an interior wherein the body has an interior surface which is interior to the machine element wherein the interior surface has a light-absorbing coating and further wherein the body has a length defined between a first end and a second end wherein the first end has a wall having an opening and further wherein the wall has an exterior surface which is exterior to the machine element;

a shaft element which is moved within the machine element wherein the shaft element extends through the opening in the wall;

a head element within the interior of the machine element wherein the head element is attached to the shaft element; and

a first brush positioned on the exterior surface of the wall wherein the first brush is exterior to the machine element and contacts the shaft element.

Claim 12 (Original): The apparatus of Claim 11 further comprising:

a seal disposed around the shaft.

Claim 13 (Original): The apparatus of Claim 11 further comprising:

a coating on the shaft element.

Claim 14 (Previously amended): The apparatus of Claim 11 further comprising:

a second brush positioned on the exterior surface of the wall.

Claim 15 (Original): The apparatus of Claim 11 further comprising:

a light source attached to the machine element.

Claim 16 (Original): The apparatus of Claim 11 further comprising:

a sensor positioned to receive reflected light within the machine element.

Claim 17 (Currently amended): A method for measuring displacement of a machine element, the method comprising the steps of:

providing a machine element having a body defining an interior wherein the body has an interior surface and a length

defined between a first wall and a second wall wherein the interior surface has a light-absorbing coating;

providing a shaft element which moves within the machine element;

attaching a head element to the shaft element wherein the head element moves towards the first wall while simultaneously moving away from the second wall;

positioning the head element adjacent to the interior surface of the machine element;

attaching a light source to the machine element at the first wall wherein the light source emits light into the interior of the machine element wherein the first wall is planar;

attaching a sensor to the machine element at the first wall wherein the shaft element is located between the sensor and the light source; and

measuring intensity of emitted light which is not absorbed by the coating on the interior surface of the machine element wherein the intensity of emitted light is detected by the sensor.

Claim 18 (Original): The method of Claim 17 further comprising the steps of:

moving the shaft element; and

producing an output signal as the shaft element moves within the machine element.

Claim 19 (Previously amended): The method of Claim 18 further comprising the steps of:

providing a processing unit that receives the output signal; and

displaying the output signal.

Claim 20 (Previously amended): The method of Claim 17 further comprising the step of:

positioning a seal within the machine element.

Claim 21 (Original): The method of Claim 17 further comprising the step of:

attaching a first brush to the machine element.

Claim 22 (Previously amended): The method of Claim 21 further comprising the step of:

attaching a second brush to the machine element.

Claim 23 (New): An apparatus for measuring displacement, the apparatus comprising:

a machine element having a body defining an interior wherein the body has an interior surface and a length defined between a first end and a second end wherein the interior surface has a light-absorbing coating;

a first wall at the first end;

a second wall at the second end substantially enclosing the interior;

a shaft element movable within the machine element;

a head element attached to the shaft element adjacent to the interior surface of the machine element;

a light source on the first wall of the machine element wherein the light source emits a light into the machine element;

a sensor positioned to detect intensity of emitted light within the machine element which is not absorbed by the coating on the interior surface of the machine element wherein the intensity of light corresponds to a position of the head element within the machine element at any point between the first end and the second end; and

a first brush positioned at the second wall of the machine element.

Claim 24 (New): The apparatus of Claim 23 wherein the first brush is constructed from wire.